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मानक

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IS 3544 (1966): General Requirements and Tests for Tag Strips [LITD 3: Electromechanical Components and Mechanical Structures for Electronic Equipment]



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IS 3544 : 2009

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( पहला पुनरीक्षण )

*Indian Standard*  
GENERAL REQUIREMENTS AND TESTS  
FOR TAG STRIPS  
( *First Revision* )

ICS 29.080.10

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**BUREAU OF INDIAN STANDARDS**  
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June 2009

Price Group 4

#### FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Electromechanical Components and Mechanical Structures for Electronic Equipment Sectional Committee had been approved by the Electronics and Information Technology Division Council.

This standard was first published in 1966. This revision has been undertaken to align it with latest practices.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be same as that of the specified value in this standard.

*Indian Standard*

# GENERAL REQUIREMENTS AND TESTS FOR TAG STRIPS

( *First Revision* )

## 1 SCOPE

**1.1** This standard covers general requirements and methods of tests for judging the mechanical, electrical and climatic properties of tag strips intended for use in electronic and telecommunication equipment.

**1.2** This standard relates to the tag strips irrespective of their methods of manufacture, when they are ready for mounting of the components.

## 2 REFERENCES

The standards listed in Annex A contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to apply the most recent editions of the standards indicated in Annex A.

## 3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

**3.1 Acceptance Tests** — Tests carried out on samples selected from a lot for the purpose of verifying the acceptability of the lot.

**3.1.1 Lot** — Tag strips of the same type, category and rating manufactured by the same factory during the same period.

**3.2 Earthing Termination** — A termination which has a special shape and size suitable for use for fixing the tag strip on a chassis as well as for providing electrical connection like the normal terminations.

**3.3 Insulator Strip** — That part of the tag strip on which the contact plugs are suitably fixed and is made of suitable insulating material.

**3.4 Maximum Current** — The current which each termination is capable of carrying continuously.

**3.5 Maximum Voltage** — The highest specified voltage from which a test voltage for voltage proof tests is derived.

**3.6 Routing Tests** — Tests carried out on each tag strip to check requirements which are likely to vary during production.

**3.7 Tag Strip** — An assembly incorporating contact terminations fixed on an insulator strip of suitable dimension for providing electrical connections.

**3.8 Termination** — That part of the tag strip which provided for soldering the electrical connections.

**3.9 Type Tests** — Test carried out to prove conformity with the requirements of the standard. These are intended to prove the general qualities and design of given type of tag strip

## 4 CLIMATIC CATEGORIES

There shall be three categories corresponding to the three climatic severities detailed below:

<i>Climatic Test</i>	<i>Category I</i>	<i>Category II</i>	<i>Category III</i>
Dry Heat	+ 100°C	+ 85°C	+ 70°C
Cold	- 55°C	- 40°C	- 10°C
Damp heat, long term	56 days	56 days	21 days
Damp heat, accelerated	6 cycles	6 cycles	2 cycles
Rapid change of temperature	+ 100 to - 55°C	+ 85 to - 40°C	Not applicable
Low air pressure	44 mbar	300 mbar	600 mbar

### NOTES

1 A recovery period of 24 h after the damp heat accelerated and damp heat long term tests is necessary for Category III components.

2 In special cases where the above categories are not applicable, other combinations of severities may be agreed to, provided such severities are chosen from IS 9000 (Part 1).

## 5 MATERIALS AND WORKMANSHIP

### 5.1 Materials

The tag strips shall be constructed from a suitable material which shall be free from flaws and shall conform to the relevant Indian Standard specification, if any. All materials used in the construction of the tag strip shall be such as are not susceptible to any mutual chemical reaction over the entire range of temperature for which the tag strips are designed.

### 5.2 Workmanship

All parts of the tag strip shall be manufactured in a

thoroughly workmanlike manner and in accordance with the current practice.

## 6 ELECTRICAL RATINGS

The following ratings shall be specified for the tag strip:

- a) Maximum current of the terminals,
- b) Maximum voltage at normal atmospheric pressure, and
- c) Maximum voltage at the appropriate low air pressure.

## 7 MARKING

7.1 Each tag strip shall be clearly marked with the following information, wherever relevant, in the order given below:

- a) Rated voltage, rated current and type of current;
- b) Manufacturer's type number;
- c) Manufacturer's name and/or trade-mark;
- d) Any additional requirements, if required by the purchaser or any other marking agreed to by the manufacturer and the purchaser; and
- e) Country of manufacturer.

7.1.1 The package of the tag strip shall contain information about the climatic category in addition to those specified in 7.1.

7.2 Any additional marking on the tag strip or its packing shall be so applied as not to cause confusion.

### 7.2.1 BIS Certification Marking

The tag strips or their cartons may also be marked with the Standard Mark.

7.2.1.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which a license for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

## 8 TESTS

### 8.1 Classification of Tests

#### 8.1.1 Number of Samples

The minimum number of samples for type tests shall be 18 for each category, type and grade of tag strip.

#### 8.1.2 Selection of Samples

The samples for testing shall be so selected as to be representative of the lot.

### 8.1.3 Sequence of Type Tests

The sequence of tests for type approval shall be in accordance with Annex B.

### 8.1.4 Routine Tests

Each and every tag strip shall be subjected to visual examination as specified in 9 and shall comply with the requirements laid down therein.

### 8.1.5 Acceptance Tests

From the log which has passed routing test, two groups of samples shall be selected. The samples shall be divided into two equal groups and the tag strips in each group shall be subjected to tests as follows:

- a) *Group A:*
  - 1) Voltage proof, and
  - 2) Insulation resistance.
- b) *Group B:*
  - 1) Dimensions,
  - 2) RF shunt resistance (if specified),
  - 3) Soldering,
  - 4) Robustness of terminations,
  - 5) Bumping, and
  - 6) Climatic sequence.

## 9 GENERAL CONDITIONS FOR TESTS

### 9.1 General

9.1.1 The tests shall be carried out on the tag strips as received. In no case shall the terminations be cleaned or otherwise prepared prior to the tests unless explicitly so agreed.

#### 9.1.2 Atmospheric Conditions for Testing

Unless otherwise specified, all tests shall be carried out under standard atmospheric conditions specified in IS 9000 (Part 1).

9.1.3 *Pre-conditioning* — Before measurements are made, the tag strips shall be stored at the measuring temperature for a time sufficient to allow the entire tag strip to reach that temperature. The recovery period called for after conditioning is adequate for this purpose.

#### 9.1.4 Correction to be Applied

When measurements are made at an ambient temperature other than the reference temperature, the results shall, where necessary, be corrected to that temperature. The ambient temperature during the tests shall be stated in the test report.

#### 9.1.5 Other Precautions

During measurements the tag strips shall not be

exposed to draughts, direct sunrays and/or other influences likely to cause errors.

## 10 VISUAL EXAMINATION AND DIMENSIONS

### 10.1 Visual Examination

The tag strips shall be visually examined for conformity with the following:

- a) Workmanship, finish and assembly shall be satisfactory.
- b) Marking shall be in accordance with 7.

**10.1.1** There shall be no deterioration in the feature mentioned in 10.1 after electrical, mechanical and climatic tests.

### 10.2 Dimensions

The dimensions of the tag strips shall be checked for conformity with those specified.

## 11 ELECTRICAL TESTS

### 11.1 Insulation Resistance

**11.1.1** The insulation resistance shall be measured by the application, for 1 min, of a voltage of 500 V dc or as specified.

**11.1.2** The tag strips shall be mounted on a metallic mounting plate and the insulation resistance measured between the following points:

- a) Mounting plate and all other parts intended to be electrically insulated from it, connected together. The earth terminations, if any shall be connected to the mounting plate.
- b) Two adjacent terminals with the least spacing between them and intended to be electrically insulated from each other.

NOTE — A minimum of two pairs of adjacent terminals shall be chosen on each tag strip for this measurement.

**11.1.3** All subsequent measurements of insulation resistance, that is, after various other tests, shall be repeated on the same pair of terminations as those stated in 11.1.2.

**11.1.4** The value of the insulation resistance shall be not less than that specified.

### 11.2 Voltage Proof

**11.2.1** The tag strips shall be mounted as specified in 11.1.2 and a voltage of 3 times the maximum voltage as specified under electrical rating (*see* 6) shall be applied for one minute between the terminals chosen for the tests in 11.1.2.

**11.2.2** The tag strips shall withstand the application of the voltage mentioned above without breakdown or flashover.

### 11.3 Corona

**11.3.1** The tag strips shall be mounted as specified in 11.1.2 and the test voltage shall be applied between the terminals indicated in 11.1.2 for five minutes in each case.

**11.3.2** The applied voltage shall have a frequency between 40 Hz and 60 Hz and it shall be increased gradually until discharge occurs. In order to determine the 'extinction voltage', the test voltage shall be decreased gradually until no discharge occurs. The value of the voltage shall then be recorded. This voltage shall not be less than the test voltage required in 11.2.

**11.3.3** A schematic circuit for this measurement is given in Fig. 1.

**11.3.3.1** The frequency of parallel resonance formed by the inductance of the choke and coil and all capacitance (such as cable capacitance to earth, input capacitance of CR tube, capacitance of connecting wires to earth, etc) shall be between 0.1 MHz and 1 MHz. At this frequency, the impedance of the circuit

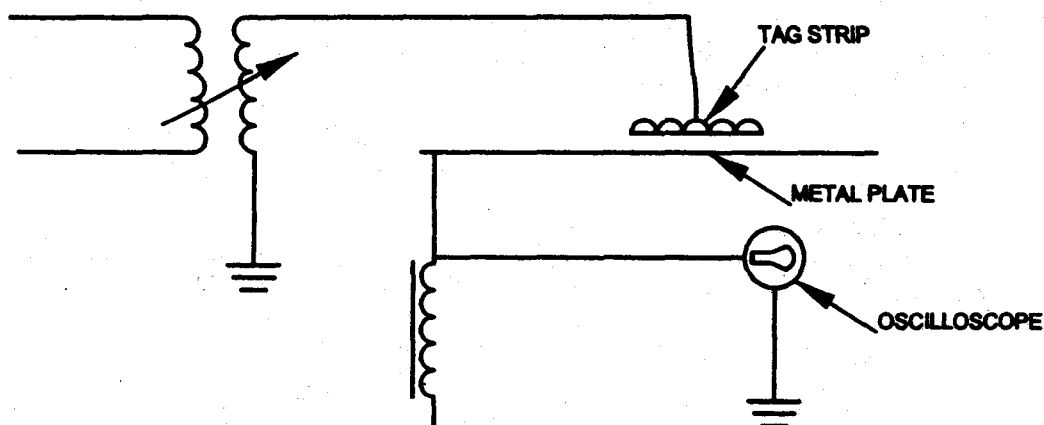


FIG. 1 CIRCUIT FOR MEASUREMENT OF CORONA



measured from the input terminal of the oscilloscope shall be not less than 0.1 M $\Omega$ . The resistance of the choke coil shall be sufficiently low so as to avoid interference from 40 Hz to 60 Hz signal at maximum sensitivity in frequency range up to 1 MHz such that corona voltages of 50  $\mu$ V can be clearly distinguished, and its input impedance shall be not less than 1.0  $\Omega$ .

#### 11.4 Capacitance

11.4.1 The tag strips shall be mounted as specified in 11.1.2.

11.4.2 The capacitance shall be measured at 1 MHz between the specified terminals.

11.4.3 The values of capacitance as measured between the various terminals shall not exceed the specified limits.

#### 11.5 Radio Frequency Shunt Resistance

11.5.1 The RF shunt resistance shall be measured between two terminals at a specified frequency.

11.5.2 The measuring method shall be chosen so as to ensure an accuracy better than  $\pm 10$  percent.

11.5.3 The value of RF shunt resistance shall be not less than that specified.

### 12 TEST FOR ROBUSTNESS OF TERMINATIONS

#### 12.1 Tensile Test

This test shall be carried out in accordance with IS 9000 (Part 19/Sec 1) tangentially in the plane of insulation board with a load as specified.

12.1.1 There shall be no sign of fracture, loosening of parts, movements relative to the body of the tag strip or any other mechanical failure.

#### 12.2 Bending Test

This test shall be carried out in accordance with 9000 (Part 19/Sec 3) for two bends. There shall be no sign of fracture, loosening of parts, movements relative to the body of the insulation board or any other mechanical failure.

### 13 SOLDERING TEST

13.1 The tag strip shall be subjected to the soldering tests in accordance with IS 9000 (Part 18/Sec 1). The method of the test, that is, Method I or Method II, the size of the soldering bit in case of Method II and period of recovery shall be as specified.

13.2 After this test, the tag strips shall be visually examined and there shall be no fracture, loosening of parts or any other mechanical failure.

### 14 VIBRATION TEST

14.1 The tag strips shall be mounted in the normal manner on a vibration table and subjected to vibration tests in accordance with IS 9000 (Part 8), for specified severity.

14.2 There shall be no fracture, loosening of parts or any other mechanical failure after the tests.

### 15 BUMP TEST

15.1 The tag strips shall be mounted on the table for bump test and shall be subjected to the bump tests in accordance with IS 9000 (Part 7/Sec 2).

15.2 There shall be no fracture, loosening of parts or any other mechanical failure after the tests.

### 16 CLIMATIC SEQUENCE

#### 16.1 Pre-conditioning

The tag strips shall be pre-conditioned as specified in 9.1.3.

#### 16.2 Dry Heat Test

16.2.1 The tag strips shall be subjected to the dry heat test in accordance with IS 9000 (Part 3/Sec 1) and IS 9000 (Part 3/Sec 3).

16.2.2 The temperature of the test chamber shall be maintained at the appropriate maximum value for the category. At the end of the period of conditioning and while still at the high temperature, the insulation resistance shall be measured.

16.2.3 The value of the insulation resistance shall be not less than that specified.

16.2.4 The tag strips shall then be removed from the dry heat chamber and allowed to remain under standard recovery conditions.

#### 16.3 Damp Heat (Accelerated) Test — First Cycle

16.3.1 This test shall be carried out in accordance with IS 9000 (Part 5/Sec 1).

16.3.2 After the specified period of conditioning the tag strips shall be removed from the chamber and allowed to recover under conditions appropriate to the test and then visually examined.

16.3.3 There shall be no visible damage. The marking shall be legible and indelible.

#### 16.4 Cold Tests

16.4.1 This test shall be carried out in accordance with IS 9000 (Part 2/Sec 1) and IS 9000 (Part 2/Sec 3).

16.4.2 The temperature of the chamber shall be

appropriate to the category of the tag strip under test and the duration of the exposure shall be two hours.

**16.4.3** Immediately after this test, the strips shall be removed from the chamber and visually examined. There shall be no mechanical deterioration.

#### **16.5 Low Air Pressure Test**

**16.5.1** The tag strips shall be subjected to the low air pressure test in accordance with IS 9000 (Part 13).

**16.5.2** The test chamber shall be maintained at a temperature of 15° to 35°C and at a pressure appropriate to the category and the duration of the test shall be five minutes. During the conditioning a dc or ac (peak) potential of twice the rated maximum working voltage shall be applied between the points mentioned in 11.1.2.

**16.5.3** There shall be no sign of glow, discharge, breakdown, flashover or harmful deformation of the tag strips.

#### **16.6 Damp Heat (Accelerated) Test — Remaining Cycles**

**16.6.1** The tag strips shall be subjected to the test in accordance with IS 9000 (Part 5/Sec 2) for the remaining number of cycle(s) appropriate to the category.

**16.6.2** At the end of the specified number of cycles, the tag strips shall be removed from the chamber and allowed to recover under recovery conditions appropriate to this test, except in the case of Category III tag strips for which the recovery period shall be 24 h.

**16.6.3** The tag strips shall then be subjected to the following tests in the order indicated:

- a) *Insulation resistance* — The insulation values shall be not less than those specified.
- b) *Voltage proof* — The tag strips shall be able to withstand the test without any breakdown.
- c) *Capacitance* — The capacitance values shall not exceed those specified.
- d) *RF shunt resistance* — The value shall be not less than that specified.

**16.6.4** The tag strips shall also be visually examined and there shall be no visible mechanical deterioration and the marking shall be legible and indelible.

#### **17 DAMP HEAT (LONG TERM EXPOSURE)**

**17.1** The tag strips shall be subjected to this test in

accordance with IS 9000 (Part 4).

**17.2** The duration of the exposure shall be appropriate to the category.

**17.3** At the end of the period of exposure, the tag strips shall be removed from the chamber and allowed to remain under recovery condition appropriate to this test except in the case of Category III tag strips for which the recovery period shall be 24 h.

**17.4** The tag strips shall then be subjected to the tests specified in 16.6.3 and shall meet the corresponding requirements.

#### **18 RAPID CHANGE OF TEMPERATURE TEST**

This test is applicable only to tag strips of Category I and Category II.

**18.1** The tag strips shall be subjected to this test in accordance with IS 9000 (Part 14/Sec 1).

**18.2** The maximum and minimum temperatures shall be appropriate to the category. The number of cycles shall be five.

**18.3** After the exposure, the tag strips shall be removed from the chamber and allowed to remain under recovery conditions appropriate to this test.

**18.4** The tag strips shall then be subjected to the tests mentioned in 16.6.3(b), and (c). The values of insulation resistance after these tests shall be not less than those specified.

#### **19 SALT MIST TEST**

**19.1** The tag strips shall be subjected to this test in accordance with IS 9000 (Part 11), the period of exposure being four days.

**19.2** After the specified period of exposure the tag strips shall be allowed to recover under the recovery conditions appropriate to this test.

**19.3** The tag strips shall be visually examined. There shall be no sign of corrosion.

#### **20 MOULD GROWTH TEST**

**20.1** The tag strips shall be subjected to this test in accordance with IS 9000 (Part 10).

**20.2** After the expiry of the specified period of exposure there shall be no mould growth on the tag strips visible to the naked eye.

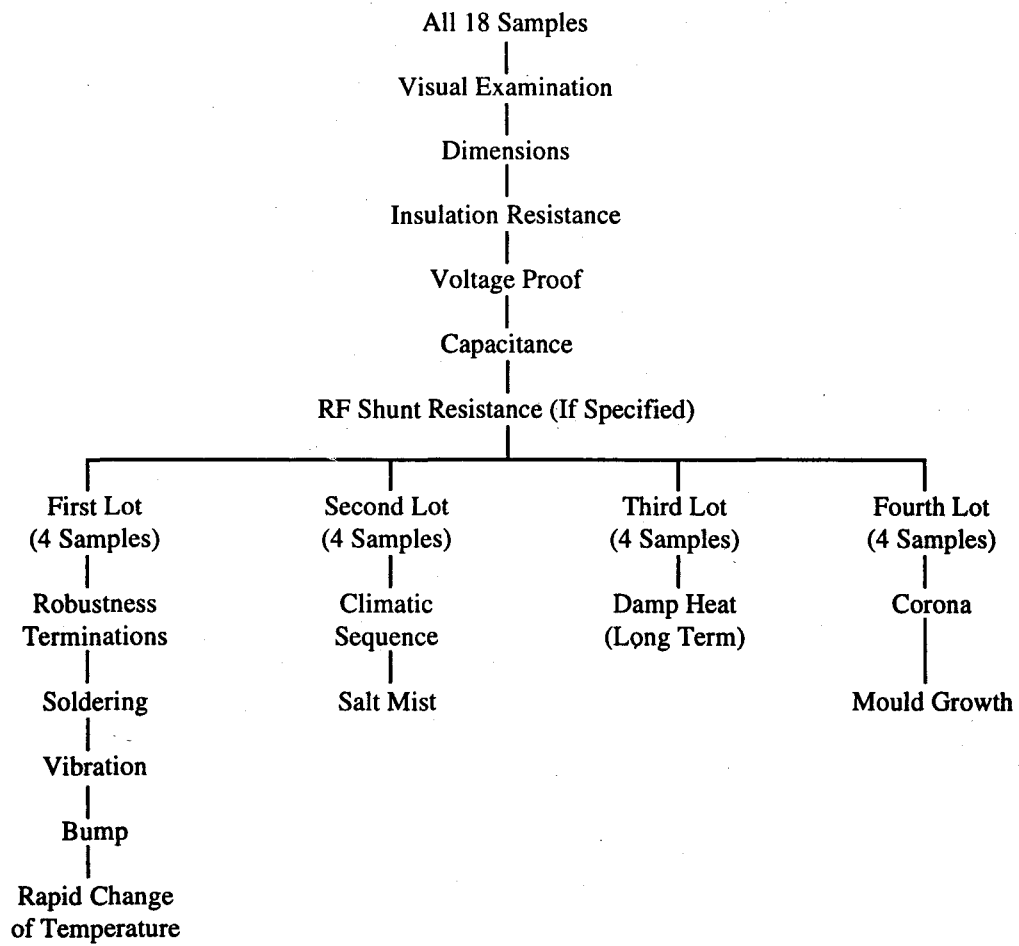
**ANNEX A**  
(Clause 2)

**LIST OF REFERRED INDIAN STANDARDS**

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
9000	Basic environmental testing procedures for electronic and electrical items:	(Part 8) :1981	Vibration (sinusoidal) test
(Part 1) :1988	General ( <i>first revision</i> )	(Part 10) :1979	Mould growth test
(Part 2/Sec 1) :1977	Cold test, Section 1 General	(Part 11) :1979	Salt mist test
(Part 2/Sec 3) :1977	Cold test, Section 3 Cold test for non-heat dissipating items with gradual change of temperature	(Part 13) :1981	Low air pressure test
(Part 3/Sec 1) :1977	Dry heat test, Section 1 General	(Part 14/Sec 1) :1988	Test N: Change of temperature, Section 1 Test Na: Rapid change of temperature (thermal shock with prescribed time of transition) — Two chamber method ( <i>first revision</i> )
(Part 3/Sec 3) :1977	Dry heat test, Section 3 Dry heat test for non-heat dissipating items with gradual change of temperature	(Part 18/Sec 1) :1981	Solderability test, Section 1 Solderability of wire and tag terminations
(Part 4) :1979	Damp heat (steady state)	(Part 19/Sec 1) :1986	Test U: Robustness of terminations and integral mounting devices, Section 1 Test Ua1: Tensile ( <i>first revision</i> )
(Part 5/Sec 1) :1981	Damp heat (cyclic) test, Section 1 16 + 18 h cycle	(Part 19/Sec 3) :1986	Test U: Robustness of terminations and integral mounting devices, Section 3 Test Ub: Bending ( <i>first revision</i> )
(Part 5/Sec 2) :1981	Damp heat (cyclic) test, Section 2 12 + 12 h cycle		
(Part 7/Sec 2) :1979	Impact test, Section 2 Bump		

**ANNEX B**  
*(Clause 8.1.3)*

**SEQUENCE OF TYPE TESTS**



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### Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards : Monthly Additions'.

This Indian Standard has been developed from Doc No.: LITD 03 (1952).

### Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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